Claims:

1. A process for the production of a polyurethane product by reaction of a mixture of

(a) at least one liquid organic polyisocyanate with

(b) at least one liquid polyol

(c) in the presence of at least one fusible catalyst, with a melting point between 35 and 130°C

(d) optionally in the presence of another polyurethane catalyst,

(e) optionally in the presence of a blowing agent; and

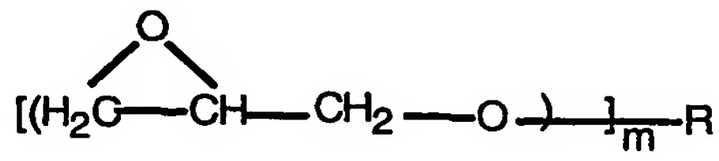
(f) optionally additives or auxiliary agents known per se for the production of polyurethane foams, elastomers and/or coatings.

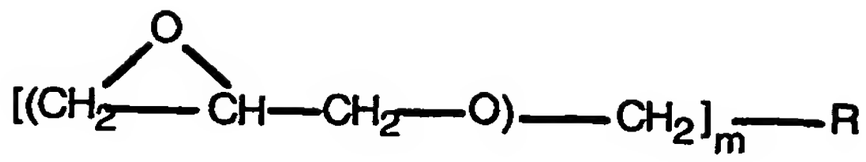
2. The process of Claim 1 wherein the fusible catalyst is the reaction product of an amine having a reactive hydrogen with an epoxide, a lactone or with a dilactone.

3. The process of Claim 2 wherein the epoxide is an aliphatic or cycloaliphatic polyepoxide or glycidyl ether.

4. The process of Claim 3 wherein the polyepoxide is a diepoxide or triepoxide.

5. The process of Claim 2 wherein the epoxide is represented by one of the formulae





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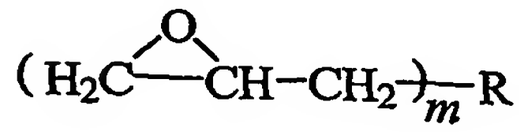


wherein R is substituted or unsubstituted aromatic, alphatic, cycloaliphatic or heterocyclic polyvalent group and n had an average value of from 1 to less than 8 and m is an integer from 1 up to the valence of R.

6. The process of Claim 3 wherein the epoxy contains less than 5 percent by weight chlorine.

7. The process of Claim 2 wherein the lactone has 6 to 20 carbon atoms in the ring.

8. The process of Claim 7 wherein the lactone is selected from epsilon-caprolactone, methylcaprolactone, pentadecalactone, and the dilactone is selected from glycolide or lactide.

9. The process of Claim 1 wherein the amine is represented by the formula $HN(R^1)_2$ where each R^1 is independently a compound having 1 to 20 carbon atoms or may be attached together with the nitrogen atom and optionally other hetero atoms and alkyl-substituted hetero atoms to form a saturated or unsaturated heterocyclic ring.

10. The process of Claim 1 wherein the amine is represented by the formula $(H)_x$-A-R^3-M-$(R^3)_y$ where A is nitrogen or oxygen; x is 2 when A is nitrogen and 1 when A is oxygen; R^3 at each occurrence is independently a linear or branched alkyl having 1 to 20 carbon atoms; M is an amine or polyamine, linear or cyclic

with at least one tertiary amine group; and y is an integer from 0 to 6.

11. The process of Claim 1 wherein the amine is represented by the formula $(H)_d$-N-$(R^3$ -M-$(R^3)_y)_b$ where N is nitrogen; R^3 at each occurrence is independently a linear or branched alkyl having 1 to 20 carbon atoms; M is an amine or polyamine, linear or cyclic with at least one tertiary amine group; y is an integer from 0 to 6; and b and d are either 1 or 2 such that the sum of b and d is 3.

12. The process of Claim 1 wherein the amine is represented by the formula $(R^4)_e$-Y-$(R^3$-M$)_f$-$(R^3)_y$ or $(R^4)_e$-Y-[$(R^3$-M) - $(R^3)_y]_f$ where

M is an amine or polyamine, linear or cyclic with at least one tertiary amine group;

R^3 at each occurrence is independently a linear or branched alkyl having 1 to 20 carbon atoms;

R^4 is hydrogen or a moiety having 1 to 20 carbon atoms, preferably R^4 is an alkyl moiety;

Y is hydrogen, oxygen or nitrogen,

y is an integer from 0 to 6;

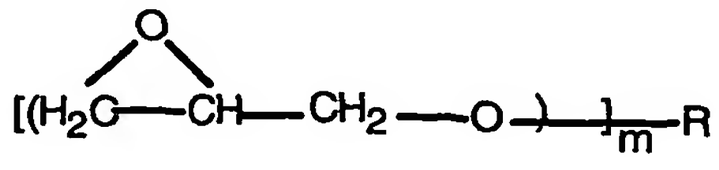
e is 0, 1 or 2;

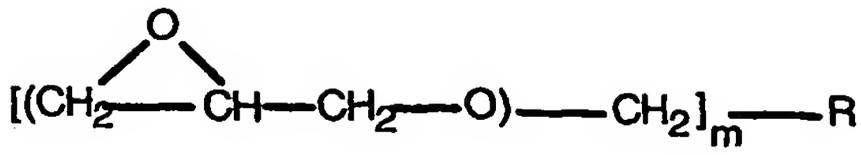
f is 1 or 2;

with the provisos that e is zero when Y is hydrogen, e and f are 1 when Y is oxygen, and when Y is nitrogen, e and f can be 1 or 2 such that the sum of e and f is 3.

13. A polyurethane product produced by the process of any one of Claims 1 to 12.

14. A polyurethane catalyst comprising the reaction product of amine having a reactive hydrogen with an epoxide wherein the epoxide is selected from one or more compounds of the formulae





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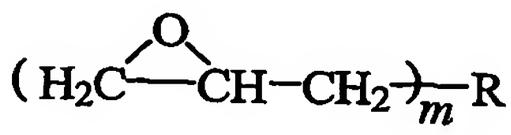

wherein R is substituted or unsubstituted aromatic, alphatic, cycloaliphatic or heterocyclic polyvalent group and n had an average value of from 1 to less than 8 and m is an integer from 1 up to the valence of R;

and the amine is selected from one or more compounds of the formulae

$HN(R^1)_2$, wherein each R^1 is independently a compound having 1 to 20 carbon atoms or may be attached together with the nitrogen atom and optionally other hetero atoms and alkyl-substituted hetero atoms to form a saturated or unsaturated heterocyclic ring,

$(H)_x$-A-R^3-M-$(R^3)_y$ A is nitrogen or oxygen; x is 2 when A is nitrogen and 1 when A is oxygen; R^3 at each occurrence is independently a linear or branched alkyl having 1 to 20 carbon atoms; M is an amine or polyamine, linear or cyclic with at least one tertiary amine group; and y is an integer from 0 to 6;

$(H)_d$-N-$(R^3$-M-$(R^3)_y)_b$ where R^3, M and y are as defined above, N is nitrogen; b and d are either 1 or 2 such that the sum of b and d is 3;

$(R^4)_e$-Y-$(R^3$-M$)_f$-$(R^3)_y$ or $(R^4)_e$-Y-$[(R^3$-M$)$ -$(R^3)_y]_f$ where M, R^3 and y are as defined above

R^4 is hydrogen or a moiety having 1 to 20 carbon atoms, preferably R^4 is an alkyl moiety;

Y is hydrogen, oxygen or nitrogen;

e is 0, 1 or 2;

f is 1 or 2;

with the provisos that e is zero when Y is hydrogen, e and f are 1 when Y is oxygen, and when Y is nitrogen, e and f can be 1 or 2 such that the sum of e and f is 3.

15. A polyurethane catalyst comprising the reaction product of amine having a reactive hydrogen with a lactone or

dilactone wherein the lactone or dilactone has 6 to 20 carbon atoms in the ring and the amine is selected from one or more compounds of the formulae $HN(R^1)_2$ wherein each R^1 is independently a compound having 1 to 20 carbon atoms or may be attached together with the nitrogen atom and optionally other hetero atoms and alkyl-substituted hetero atoms to form a saturated or unsaturated heterocyclic ring,

$(H)_x$-A-R^3-M-$(R^3)_y$ where A is nitrogen or oxygen; x is 2 when A is nitrogen and 1 when A is oxygen; R^3 at each occurrence is independently a linear or branched alkyl having 1 to 20 carbon atoms; M is an amine or polyamine, linear or cyclic with at least one tertiary amine group; and y is an integer from 0 to 6;

$(H)_d$-N-$(R^3$-M-$(R^3)_y)_b$ where R^3, M and y are as defined above, N is nitrogen; b and d are either 1 or 2 such that the sum of b and d is 3; or

$(R^4)_e$-Y-$(R^3$-M$)_f$-$(R^3)_y$ or $(R^4)_e$-Y-$[(R^3$-M$)$ -$(R^3)_y]_f$ where M, R^3 and y are as defined above

R^4 is hydrogen or a moiety having 1 to 20 carbon atoms, preferably R^4 is an alkyl moiety;

Y is hydrogen, oxygen or nitrogen;

e is 0, 1 or 2;

f is 1 or 2;

with the provisos that e is zero when Y is hydrogen, e and f are 1 when Y is oxygen, and when Y is nitrogen, e and f can be 1 or 2 such that the sum of e and f is 3.

16. A polyisocyanate terminated polymer produced by the mixing a molar excess of polyisocyanate with a catalyst of Claim 14 or 15.

17. A polyol terminated prepolymer produced by the mixing of a molar excess of a catalyst of Claim 14 or 15 with a polyisocyanate.